*Fisheries Journal*, 14(4), 2257-2267 (2024)
http://doi.org/10.29303/jp.v14i4.1302

# CAPTURE FISHERIES BUSINESS ANALYSIS OF THE TROLL LINE FISHING FLEET AT THE PALABUHANRATU ARCHIPELAGO FISHING PORT, SUKABUMI, INDONESIA

## Analisis Usaha Perikanan Tangkap Armada Pancing Tonda di Pelabuhan Perikanan Nusantara Palabuhanratu, Sukabumi, Indonesia

Faqih Baihaqi[1*], Shafira Bilqis Annida[2]

[1]Department of Fisheries, Faculty of Fisheries and Marine Sciences, Padjadjaran University, Jatinangor, Indonesia 45363, [2]Marine Tourism Study Programe, Vocational School, Padjadjaran University, Jatinangor, Indonesia 45363

*Bandung Sumedang Main Street KM 21, Jatinangor, West Java 45365*

[*]Coresponding author: faqih.baihaqi@unpad.ac.id

(Received November 27th 2024; Accepted December 13th 2024)

**ABSTRACT**

The troll line fishing fleet is one of several capture fisheries business units often found at the Palabuhanratu Archipelago Fishing Port, Sukabumi, Indonesia. The Sukabumi Central Capture Fisheries Statistics Agency noted a decrease in trolling boats catching and landing fish at the Palabuhanratu Archipelago Fishing Port in the last ten years. This condition allegedly indicates a decline in income for the capture fisheries business players. This research evaluated the net income value of the catch fisheries business unit of the troll line fishing fleet at the Palabuhanratu Archipelago Fishing Port. Data was collected using survey and interview methods from January to March 2023. The purposive sampling method highlighted that 15 respondents consisting of ship owners, captains, and crew members of fishing boats were appointed as sources for this research. Analysis of the fishing business of the Troll Line fishing fleet evaluates the average net income value as 636,496,667 IDR/vessel/year. This net income value is distributed among seven business actors consisting of ship owners (317,596,429 IDR/year), a captain (95,278,929 IDR/year), and four crew members (55,579,375 IDR/person/year). The evaluation value of net income indicates that the fisheries business unit caught by the troll line fishing fleet at the Palabuhanratu Archipelago Fishing Port still has quite promising profits for all business actors.

Keywords: Capture Fisheries Business, Catch Production, Fishing Business Capital, Troll Line Fishing Fleet

**ABSTRAK**

Pancing tonda merupakan satu diantara beberapa unit usaha perikanan tangkap yang banyak dijumpai di Pelabuhan Perikanan Nusantara Palabuhanratu, Sukabumi, Indonesia. Badan Pusat Statistik Perikanan Tangkap Sukabumi, mencatat adanya penurunan jumlah kapal pancing tonda yang aktif melakukan penangkapan dan pendaratan ikan di Pelabuhan Perikanan

Tangkap Nusantara Palabuhanratu dalam kurun waktu 10 tahun terakhir. Kondisi ini disinyalir merupakan indikator yang menandakan adanya penurunan pendapatan bagi pelaku bisnis armada perikanan tangkap tersebut. Penelitian ini dilakukan untuk mengevaluasi nilai pendapatan bersih dari unit bisnis perikanan tangkap armada pancing tonda di Pelabuhan Perikanan Nusantara Palabuhanratu. Pengambilan data dengan metode survei dan wawancara dilakukan sejak Januari hingga Maret 2023. Metode purposive sampling menggarisbawahi sebanyak 15 responden yang terdiri atas pemilik kapal, nahkoda, dan anak buah kapal pancing tonda ditetapkan sebagai narasumber pada penelitian ini. Analisa usaha bisnis perikanan tangkap armada pancing tonda mengevaluasi rata-rata nilai pendapatan bersih armada pancing tonda sebesar 636.496.667 IDR/kapal/tahun. Nilai pendapatan bersih ini dibagikan kepada 7 orang pelaku usaha yang terdiri atas pemilik kapal (317.596.429 IDR/tahun); nahkoda (95.278.929 IDR/tahun); dan 4 orang anak buah kapal (55.579.375 IDR/orang/tahun). Nilai evaluasi pendapatan bersih mengisyaratkan unit bisnis perikanan tangkap armada pancing tonda di Pelabuhan Perikanan Nusantara Palabuhanratu masih memiliki keuntungan yang cukup menjanjikan bagi seluruh pelaku usaha.

Kata Kunci: Analisis Usaha Perikanan Tangkap, Armada Pancing Tonda, Keuntungan Usaha Perikanan Tangkap, Produksi Hasil Tangkapan

## INTRODUCTION

The capture fisheries business in Indonesia is increasingly showing a positive growth trend. The Indonesian Ministry of Maritime Affairs and Fisheries released an increase in capture fisheries production in Indonesia in 2022, reaching 2.01 million tonnes with a monetization value of over 66.2 trillion rupiah. This value has increased by 31.62% compared to the previous year. There has also been an increase in the new fisheries business actors, such as fishermen, inter-port marketers, fish marketers, and fisheries processing actors, who recorded an increase of 207,230 people in the last two years (MFA, 2022).

Enhancement in capture fisheries production also occurred at the Palabuhanratu Archipelago Fishing Port, Sukabumi (Suherman *et al*., 2020). Statistics on capture fisheries production data at the Palabuhanratu Archipelago Fishing Port tended to experience a significant increase from 1993 to 2013. Fisheries production experienced a decline in the 2013-2017 period. However, a positive growth trend began again after 2017, with an average growth of 21.4% yearly (MFS, 2019).

The Troll Line fishing fleet is one of several fleets most often found at the Palabuhanratu Archipelago Fishing Port (Apriliani *et al*., 2021). The trolling fishing fleet always occupies >20.8% of the total active fishing fleet at the Palabuhanratu Archipelago Fishing Port (CSA, 2022). On the other hand, the number of trolling fishing fleets has continuously decreased in the last ten years (MFS, 2022).

Taniu *et al*. (2023) stated that fishermen's income is one indicator that explains the decline or increase in the number of fishing fleets. Analysis and evaluation of the income of capture fisheries business actors can explain the business economic conditions of a capture fisheries business unit (Vinay *et al*., 2017). Business analysis can also compare the business income performance of several capture fisheries business units operating in the same fishing area (Mas'ud *et al.*, 2018; Purwasih *et al.*, 2016).

Research on the valuation of the trolling fisheries business has been carried out in several regions in Indonesia, such as in Latulahat Village, Ambon (Kewilaa 2023); Barru Regency, South Sulawesi (Mas'ud *et al*., 2018); Labuhan Lombok Beach Fishing Harbor, East Lombok Regency (Gigentika *et al*., 2013); Wakatobi Regency, Southeast Sulawesi (Hendri *et al*., 2018); Bombana Regency, Southeast Sulawesi (Asri *et al*., 2019); and in Pacitan, East Java (Purwasih *et al*., 2016). This research evaluated the income of fisheries business actors

from fishing fleets at the Palabuhanratu Archipelago Fishing Port, Sukabumi, Indonesia. The results of this research will provide an overview of the economic conditions of the fishing business. It can also be a source of literacy for comparison with the economic conditions of the business of other fishing fleet units at the Palabuhanratu Archipelago Fishing Port.

## METHODS

### Research Materials

This research was executed at the Palabuhanratu Archipelago Fishing Port, Sukabumi, Indonesia, from January to March 2023. Research data was obtained based on survey methods and direct interviews. The troll line fishing business actors were targeted as respondents in this research. The business actors are the ship owner, captain, and crew.

In previous research, Apriliani *et al.* (2021) found several fishing fleets led by different boat owners. Based on this information, we mapped 15 respondents from five different fishing groups. Specifically, we used a purposive sampling method to select respondents. The data we collect consists of information on the specifications of the fishing fleet, the production value and selling price of the catch, and the fishing business expenses for the fishing fleet.

### Data Analysis

Catch production data is used to analyze the catch composition of the troll line fishing fleet. The percentage value of catch composition is calculated based on the formula (Odum 1983):

$$\left[ \text{Catch composition } (\%) = \frac{P_i}{P} \text{ x } 100 \right]$$

Where $P_i$: the number of catches of a particular species; and P: total number of catches.

Production and sales price data for catches obtained from each respondent were used to calculate the estimated gross income value of the fishing fleet business. The gross income value is calculated using a formula referring to Primyastanto & Wati (2018):

$$\left[ TR = \sum P \; x \; Q \right]$$

Where TR: Total Revenue; P: selling price of a particular species; Q: catch production of certain species.

Total expenditure costs are analyzed based on the cumulation of two types of expenses, grouped based on their nature, namely fixed costs (FC) and operational costs or variable costs (VC). Güngör (2017) stated that fixed costs refer to the principal investment capital of a capture fisheries business and the asset maintenance costs of that investment capital. The value of investment assets is generally calculated as depreciation costs based on the active age of a business asset that can be used optimally. Calculation of depreciation costs is calculated with the following function:

$$\left[ DC = \frac{Y_i}{T_i} \right]$$

With DC: depreciation costs; $Y_i$: investment capital of an asset; $T_i$: the technical age of an asset.

Variable costs are generally related to every expense that needs to be paid continuously in each cycle of the fisheries business (Güngör, 2017). Details regarding fixed and variable costs calculated in this research are presented in Table 1.

Table 1. Details of Expenditure Costs for The Fisheries Business Unit for The Troll Line Fishing Fleet

| No. | Fixed Cost Details* | Variable Cost Details |
|---|---|---|
| 1 | Fishing vessel | Diesel fuel |
| 2 | Fishing vessel engine | Ice block |
| 3 | Fishing equipment | Machine oil |
| 4 | Fish aggregating device | Freshwater supply |
| 5 | Lights generator | Food supply |

*Each fixed-cost item consists of depreciation costs and asset maintenance costs.

## RESULT

The troll line is one of several fishing fleets that can be found at the Palabuhanratu Archipelago Fishing Port. The boats from the trolling fishing fleet are still classified as traditional boats made from teak, kempas, and ironwood. In fishing activities, trolling fishing fleets generally have tools like fish aggregating devices made from coconut leaves. The specifications of the troll line fishing fleet are comprehensively presented in Table 2.

Table 2. Specifications of The Troll Line Fishing Fleet at The Palabuhanratu Archipelago Fishing Port, Sukabumi

| No. | Specification | Details |
|---|---|---|
| 1 | Fishing vessel | |
| | - Length | 12,3 - 15,4 meter |
| | - Width | 2,9 - 3,6 meter |
| | - Height | 1 - 1,3 meter |
| | - Size criteria | 6 - 8 Gross Tonnage |
| | - The main material | Taek, kempas, and ironwood |
| 2 | Fishing vessel engine | 22 - 30 PK/HP |
| 3 | Fishing tools | *Tonda, tomba, taber, layangan*, dan handline |
| 4 | Supporting fishing tools | |
| | - Fish Aggregating Device (FAD) | Made of coconut leaves. |
| | - Global Positioning System (GPS) | eXplorist 100 or Garmin 66s |

The troll line fishing fleet at the Palabuhanratu Archipelago Fishing Port generally targets sizeable pelagic fish with high economic value. Skipjack tuna, yellowfin tuna, and bigeye tuna are the main catches from the trolling fleet. Other catches from the trolling fleet include striped marlin, common dolphinfish, sailfish, rainbow runner, mackerel, barracuda, and frigate tuna. Apart from pelagic fish, squid is also a component of the catch of the troll line fishing fleet, which is widely obtained (Table 3).

Table 3. Average of Annual Production and Catch Composition of Each Troll Line Fishing Fleet at The Palabuhanratu Archipelago Fishing Port

| No. | Catch Commodities | Average of Catch Production (kg)* | Catch Composition (%) |
|---|---|---|---|
| **1** | **Main Catch** | **601,972** | **80.95%** |
| | Skipjack tuna (*Katsuwonus pelamis*) | 292,128 | 39.29% |
| | Yellowfin tuna (*Thunnus albacares*) | 202,556 | 27.24% |

| No. | Catch Commodities | Average of Catch Production (kg)* | Catch Composition (%) |
|---|---|---|---|
| | Bigeye tuna (*Thunnus obesus*) | 107,288 | 14.43% |
| **2** | **Other Catches** | **141,643** | **19.05%** |
| | Striped marlin (*Kajikia audax*) | 90,328 | 12.15% |
| | Common dolphinfish (*Coryphaena hippurus*) | 20,673 | 2.78% |
| | Squid (*Loligo* sp.) | 19,667 | 2.64% |
| | Sailfish (*Istiophorus platypterus*) | 4,267 | 0.57% |
| | Rainbow runner (*Elagatis bipinnulata*) | 2,882 | 0.39% |
| | Mackerel (S*comberomorus commerson*) | 1,827 | 0.25% |
| | Barracuda (*Sphyraena barracuda*) | 1,002 | 0.13% |
| | Frigate tuna (*Auxis thazard*) | 988 | 0.13% |
| **Total of Catch Production** | | **743,606** | **100.00%** |

The total fixed costs (FC) in one year from the trolling fleet fishing business at the Palabuhanratu Archipelago Fishing Port are 144,433,333 IDR with a deviation value of 1,874,135 IDR. This value is the cumulation of asset depreciation costs of IDR 127,533,333 and asset maintenance costs of IDR 16,900,000 (Table 4).

Table 4. Average of Annual Fixed Costs for Troll Line Fishing Fleet

| Respondent Number | Depreciation Costs (IDR) | Maintenance Costs (IDR) | Total of Fixed Costs (IDR) |
|---|---|---|---|
| 1 | 123,000,000 | 20,000,000 | 143,000,000 |
| 2 | 130,000,000 | 15,500,000 | 145,500,000 |
| 3 | 122,000,000 | 20,000,000 | 142,000,000 |
| 4 | 125,000,000 | 17,500,000 | 142,500,000 |
| 5 | 130,000,000 | 15,800,000 | 145,800,000 |
| 6 | 123,000,000 | 18,200,000 | 141,200,000 |
| 7 | 127,000,000 | 18,500,000 | 145,500,000 |
| 8 | 132,000,000 | 15,500,000 | 147,500,000 |
| 9 | 128,000,000 | 17,500,000 | 145,500,000 |
| 10 | 126,000,000 | 16,800,000 | 142,800,000 |
| 11 | 131,000,000 | 15,700,000 | 146,700,000 |
| 12 | 129,000,000 | 15,500,000 | 144,500,000 |
| 13 | 130,000,000 | 15,200,000 | 145,200,000 |
| 14 | 128,000,000 | 15,000,000 | 143,000,000 |
| 15 | 129,000,000 | 16,800,000 | 145,800,000 |
| **Average** | **127,533,333** | **16,900,000** | **144,433,333** |
| **Deviation** | **3,113,718** | **1,674,174** | **1,874,135** |

The total operational or variable costs (VC) in one year from the troll line fleet fishing business at the Palabuhanratu Archipelago Fishing Port are 212,550.00 IDR with a deviation value of 2,079,234 IDR. Total operational costs consist of costs incurred for purchasing ship fuel amounting to IDR 25,600,000 and supplies costs amounting to IDR 186,950,000 (Table 5).

Table 5. Average of Annual Variable Costs for Troll Line Fishing Fleet

| Respondent Number | Fuel Cost (IDR) | Supplies Costs (IDR)* | Total of Variable Costs (IDR) |
|---|---|---|---|
| 1 | 24,750,000 | 186,000,000 | 210,750,000 |
| 2 | 27,000,000 | 185,250,000 | 212,250,000 |
| 3 | 25,500,000 | 189,000,000 | 214,500,000 |
| 4 | 24,750,000 | 189,000,000 | 213,750,000 |
| 5 | 24,750,000 | 185,250,000 | 210,000,000 |
| 6 | 26,250,000 | 188,250,000 | 214,500,000 |
| 7 | 27,000,000 | 184,500,000 | 211,500,000 |
| 8 | 26,250,000 | 184,500,000 | 210,750,000 |
| 9 | 24,750,000 | 185,250,000 | 210,000,000 |
| 10 | 25,500,000 | 188,250,000 | 213,750,000 |
| 11 | 24,000,000 | 193,500,000 | 217,500,000 |
| 12 | 25,500,000 | 186,750,000 | 212,250,000 |
| 13 | 26,250,000 | 186,000,000 | 212,250,000 |
| 14 | 25,500,000 | 188,250,000 | 213,750,000 |
| 15 | 26,250,000 | 184,500,000 | 210,750,000 |
| **Average** | **25,600,000** | **186,950,000** | **212,550,000** |
| **Deviation** | **890,425** | **2,462,577** | **2,079,234** |

*Supplies costs include ice blocks, machine oil, and freshwater supplies.

Income analysis based on the production value and selling price of the catch calculates the average gross income of the catch fisheries business unit of the trolling fleet at the Palabuhanratu Archipelago Fishing Port of 993,480,000 IDR with a deviation value of 71,681,679 IDR. After deducting total fixed and operational costs, The net income value is 636,496,667 IDR/ship/year (Table 6).

Table 6. The Average Annual Gross Income and Net Profit of The Trolling Fleet Fishing Business

| Respondent Number | Total of Gross Income (IDR) | Total of Net Profit (IDR) |
|---|---|---|
| 1 | 982,700,000 | 628,950,000 |
| 2 | 890,800,000 | 533,050,000 |
| 3 | 988,400,000 | 631,900,000 |
| 4 | 1,027,800,000 | 671,550,000 |
| 5 | 1,105,300,000 | 749,500,000 |
| 6 | 900,300,000 | 544,600,000 |
| 7 | 888,500,000 | 531,500,000 |
| 8 | 1,009,300,000 | 651,050,000 |
| 9 | 1,102,200,000 | 746,700,000 |
| 10 | 920,200,000 | 563,650,000 |
| 11 | 1,086,100,000 | 721,900,000 |
| 12 | 966,300,000 | 609,550,000 |
| 13 | 1,003,100,000 | 645,650,000 |
| 14 | 1,019,900,000 | 663,150,000 |
| 15 | 1,011,300,000 | 654,750,000 |
| **Average** | **993,480,000** | **636,496,667** |
| **Deviation** | **71681,679** | **71,242,800** |

The total value of net profits is commonly distributed to 6 fisheries business actors consisting of the ship owner (50% TR), ship captain (15% TR), and four crew members (35% TR). The net annual income for each fishing business actor is 317,596,429 IDR for the ship owner, 95,278,929 IDR for the captain, and 55,579,375 IDR for each crew member (Table 7).

Table 7. The Average Annual Net Income of Each Fisheries Business Actor Using the Troll Line Fishing Fleet

| Respondent Number | Ship owner (IDR) | Captain (IDR) | Crew Member (IDR) |
|---|---|---|---|
| 1 | 314,475,000 | 94,342,500 | 55,033,125 |
| 2 | 266,525,000 | 79,957,500 | 46,641,875 |
| 3 | 315,950,000 | 94,785,000 | 55,291,250 |
| 4 | 335,775,000 | 100,732,500 | 58,760,625 |
| 5 | 374,750,000 | 112,425,000 | 65,581,250 |
| 6 | 272,300,000 | 81,690,000 | 47,652,500 |
| 7 | 265,750,000 | 79,725,000 | 46,506,250 |
| 8 | 325,525,000 | 97,657,500 | 56,966,875 |
| 9 | 373,350,000 | 112,005,000 | 65,336,250 |
| 10 | 281,825,000 | 84,547,500 | 49,319,375 |
| 11 | 360,950,000 | 108,285,000 | 63,166,250 |
| 12 | 304,775,000 | 91,432,500 | 53,335,625 |
| 13 | 322,825,000 | 96,847,500 | 56,494,375 |
| 14 | 331,575,000 | 99,472,500 | 58,025,625 |
| 15 | 327,375,000 | 98,212,500 | 57,290,625 |
| **Average** | **317,596,429** | **95,278,929** | **55,579,375** |
| **Deviation** | **35,621,400** | **10,686,420** | **6,233,745** |

## DISCUSSION

The Troll Line fishing fleet is one of several fleets often found at the Palabuhanratu Archipelago Fishing Port. The trolling fishing fleet generally has vessels between 6-8 gross tons, the most frequently encountered being 6 GT. The cruising range of fishing operations from the trolling fleet is usually located at 105°30'-106°50' East Longitude and 6°59'- 8°22' South Latitude in the Fisheries Management Area of the Republic of Indonesia 573 in the Indian Ocean (Apriliani *et al.* 2021).

As a fishing business unit, the trolling fleet has initial investment capital. Investment capital is one of the main components a business unit needs to run its business (Fitri *et al.* 2013). The investment capital in question consists of the costs of purchasing several main assets, such as fishing vessels, ship engines, fishing equipment, FAD, and generator lights. Fishing vessels are the principal capital investment with the most expensive asset costs compared to other types of assets. The average price of purchasing a trolling fishing boat is IDR 196,428,571, with a technical life of 10 years. Fishing vessels also require maintenance costs, generally incurred every six months, with an average maintenance cost of IDR 2,707,143.

The high cost of fishing vessels is based on the type and quality of wood and the raw material for making them. The fishing vessels of the trolling fleet are composed of wood from teak, kempas, and ironwood trees. Teak wood is generally used as the main frame of ships. Teak wood was chosen as the primary material for constructing the mainframe because it is strong, highly durable, and resistant to seawater acidity (Paputungan *et al.* 2022). Kempas wood and ironwood are used as ship trusses, ship keels, and building blocks for the ship's floor and deck. Kempas wood has the characteristics of a relatively high specific gravity and is robust

against pressure of up to 703.11 Kn/m2. This characteristic also makes kempas wood resistant to weathering due to seawater pressure (Ahmad and Nofrizal 2009). Ironwood has strong characteristics, high durability, and can withstand attacks by biofouling organisms such as barnacles and sea worms with an attack intensity of <7% (Boroya *et al.* 2023). Ironwood is also included in the class 1 quality wood group; it isn't easy to find comparisons (Sidiyasa and Juliaty 2003).

The troll line fishing fleet has a driving force source as an engine with a 22-30 PK/HP specification. The engine brands used vary, such as Fanter, Mitsubishi, Yanmar, MWM, and Jiandong (Rahmat and Patadjangi 2008). Each fishing boat generally carries two ship engines, one main engine and one spare engine. The average asset investment price for ship engines is IDR 42,928,571, with a 2-3 years technical life. Ship engine maintenance or upkeep is generally accomplished every three months with an average cost of IDR 835,714.

The trolling fleet has five types of fishing gear used in fishing operations. The five fishing tools are known as *tonda*, *tomba*, *taber*, *layangan*, and hand line. There are differences in specifications between the five types of fishing gear available. *Tonda*, *layangan*, and hand lines are fishing gear commonly used to target fish weighing 5-20 kg. These three fishing tools have hook numbers between 6-8. The *tomba* has hook numbers of 1-3 and targets larger pelagic fish. Meanwhile, *taber* is a fishing tool commonly used to catch squid or small pelagic fish, which will be used as bait to catch larger fish (Annida *et al.* 2021). The average investment asset value of the entire fishing gear fleet is IDR 5,571,429, with an active usage age of no more than six months.

The troll line fishing fleets generally use tools like Fish Aggregating Devices (FAD) to collect target fish. The FAD used in trolling fishing operations is composed of coconut leaves. This FAD is generally replaced every three months (Apriliani *et al*. 2021). We recorded that the average asset value for FAD in the trolling fishery was IDR 56,428,571. Each group of trolling fishermen at the Palabuhanratu Archipelago Fishing Port generally has 1-2 FADs set at certain fishing areas in marine waters. Each fishing group typically has 2-5 fishing vessels (Apriliani *et al*. 2021).

The last type of investment asset for the trolling fishing fleet is generator lights. Even though the trolling fishing fleet is not included in the light fishing group, generator lights are still needed to assist with the technical operation of fishing gear and lighting at night (Apriliani *et al.* 2021). The average asset value of purchasing generator lights for the trolling fleet is IDR 5,142,857, with a technical lifespan of 1 year.

Apart from investment capital and asset maintenance costs as fixed costs, the fishing fleet fishing business unit has operational or variable costs besides investment capital and asset maintenance costs as fixed costs. Operational costs in capture fisheries businesses are a component of the costs incurred on each fishing trip (Tambunan *et al.* 2018).

The operational cost components consist of ship fuel and supplies costs. The cost of supplies consists of food, an oil machine, ice blocks for cold storage of the catches, and freshwater supplies. Ship fuel is the main operational cost component with an expenditure value of IDR 1,826,786/trip or IDR 25,600,000/year. The fuel used is diesel, which is needed per trip between 300 and 400 liters. The total average cost of other supplies is 13,353,571 IDR/trip or 186,950,000 IDR/year.

Troll line is one of the fishing fleets that target sizeable pelagic fish with fast movements as their main catch (Rahmat and Ilhamdi 2015). This research found three primary catch commodities: skipjack, yellowfin, and bigeye. In other research, it was found that these three commodities were also the main catch for various fishing gear, which were also found at the Palabuhanratu Archipelago Fishing Port, such as tuna longlines (Annida *et al.* 2023) and *payang* (Annida *et al.* 2024).

Apart from the three primary catch commodities, we also found eight by-catch commodities consisting of large pelagic fish such as striped marlin, common dolphinfish, sailfish, rainbow runner, mackerel, barracuda, and frigate tuna. We also found squid as one of the catches widely obtained. For this reason, we found that all catches from the trolling fleet are included in captured fisheries commodities with high economic value. Yuliyanah *et al.* (2019) stated that many of the catches from the trolley fishing fleet landed at the Palabuhanratu Archipelago Fishing Port, including tuna and other large pelagics, were sold for export abroad, such as to Japan, the United States, and several European Union countries.

The average gross income value from sales of trolley fishing fleet catches is 70,962,857 IDR/trip or 993,480,000 IDR/year. After deducting fixed and operational costs, the average net income is 636,496,667 IDR/ship/year. This net income value is distributed to each capture fisheries business actor for 317,596,429 IDR/year for the ship owner, 95,278,929 IDR/year for the captain, and 55,579,375 IDR/year for each crew member. This net income value is not much different from the analysis of trolling fishing businesses in other areas, such as Pacitan-East Java. Purwasih *et al.* (2016) calculated the revenue of the fishing business unit from the trolling fleet at the Paniat Pacitan Fishing Port, East Java, at 635,330,000 IDR/year.

The net income value of each actor in the troll line fishing business shows that the business conditions of this fishing business are still quite promising. This income value is even higher than the average income of fishermen or the average minimum income value of Sukabumi Regency. Devita *et al*. (2023) stated that the average income of fishermen in Sukabumi Regency is 3,480,000 IDR/month or 41,760,000 IDR/year. As determined by the local government, the average minimum income in Sukabumi Regency is 3,125,444 IDR/month or 37,505,328 IDR/year.

## CONCLUSION

Fisheries caught by trolling fishing fleets at the Palabuhanratu Archipelago Fishing Port still have quite promising business benefits for all fisheries business actors. The average value of net income for each trolley fishing business actor is 317,596,429 IDR/year for the ship owner, 95,278,929 IDR/year for the captain, and 55,579,375 IDR/year for each crew member.

## ACKNOWLEDGEMENT

We would like to express our thanks to the extended family of the troll line fishing group at the Palabuhanratu Archipelago Fishing Port. To all ship owners, captains, and ship crew from KM. Doa Ibu, KM. Dua Anak, KM. Sinar Mas, KM. Fajar Mas, KM. Bojo Loro and other groups of trolling fishermen at the Palabuhanratu Archipelago Fishing Port who have agreed to be sources for our research.

## REFERENCES

Ahmad, M., & Norfizal. (2009). About the weathering of wooden ships [in-Bahasa]. *Jurnal Perikanan dan Kelautan. 14*(2), 135-146.

Annida, S. B., Apriliani, I. M., & Baihaqi F. (2021). The biological aspects of the main targets of troll line at Palabuhanratu Fishing Port. Indonesia. *Asian Journal of Fisheries and Aquatic Research, 13*(6), 2582-3760.

Annida, S. B., Baihaqi F., & Yanuar, F. S. (2023). Productivity and catch composition of the tuna longline fishing fleet at the Palabuhanratu Archipelago Fishing Port, Sukabumi, Indonesia. *Jurnal Fisheries Gorontalo, 6*(2), 95-107.

Annida, S. B., Baihaqi F., & Yanuar, F. S. (2024). Productivity and catch composition of the payang fishing fleet in the Palabuhanratu Archipelago Fishing Port, Sukabumi, Indonesia. *Global Scientific Journals, 12*(2), 1-6.

Apriliani, I. M., Annida, S.B., Baihaqi, F. (2021). Description of troll line unit at Palabuhanratu Fishing Port, Sukabumi, Indonesia. *International Journal of All Research Writings, 3*(1), 85-89.

Asri, M., Budiyanto, & Riani, I. (2019). Analysis on effort of fish capture using troll line and bottom long line in Central Rumbia District, Bombana Regency. *Jurnal Sosial Ekonomi Perikanan FPIK UHO, 4*(2), 4-15.

Boroya, U. B. A., Mahdie, M. F., & Thamrin, G. A. R. (2023). Durability test of iron wood (*Eusideroxylon zwageri*), bengkirai wood (*Shorea laevifoia* Endert), and red meranti wood (*Shorea leprosula* Miq) as raw material for making boats against wood-destroying organisms. *Jurnal Sylva Scienteae, 6*(1), 170-176.

Central Statistic Agency of Fisheries Capture [CSA]. (2022). Capture fisheries statistics for Sukabumi Regency in 2022. Center for Statistical Data and Information, Secretariat General of the Ministry of Maritime Affairs and Fisheries. Sukabumi, Indonesia.

Devita, D., Meilani, E. H., & Astutiningsih, E. R. (2023). Income analysis of fishing communities in Cikahuripan Village, Sukabumi Regency. *Jurnal Ilmiah Mahasiswa Agroinfo Galuh, 10*(2), 1196-1205.

Fitri, A., Ismail, Wismaningrum, K. (2013). Financial analysis of one day fishing business using multigear In Tawang Fishing Port of Kendal Regency. *Journal of Fisheries Resources Utilization Management and Technology, 2*(3), 263-272.

Gigentika, S., Wisudo, S. H. & Mustaruddin. (2013). Financial feasibility for business of fisheries troll line at Labuhan Lombok Coastal Fishing Port District, East Lombok. *Buletin PSP, 21*(2), 137-148.

Güngör, G. (2017). The role of microeconomic studies in decision-making of fishery management. *Journal of Aquaculture Engineering and Fisheries Research, 3*(2), 65-74.

Hendri, Pangemana, J. F., & Lumenta, V. (2018). Socio-economic conditions of troll line fishermen in Kampo-Kampo Village, Binongko District, Wakatobi Regency, Southeast Sulawesi Province. *Akulturasi, 6*(12), 979-988.

Indonesian Ministry of Fisheries and Marine Affairs [FMA]. (2022). Release of Marine and Fisheries Data for Quarter IV 2022 [in-Bahasa]. Center for Statistical Data and Information, Secretariat General of the Ministry of Maritime Affairs and Fisheries. Jakarta. Indonesia.

Kewilaa, D. M. (2023). Capture fisheries business analysis of troll line in Latuhalat Village, Nusaniwe District [in-Bahasa]. *Jurnal Biosaintek, 5*(1), 83-87.

Mas'ud, R. M., Baso, A., & Adhawati, S. S. (2018). Comparative analysis of income of trolling line and set lingline fishing fisherman in Mallusetasi District, Barru Regency. *Torani Journal of Fisheries and Marine Science, 2*(1), 44-51.

Odum, E. P. (1983). *Basic ecology*. New York, United State of America: CBS College Publishing.

Paputungan, H., Modaso, V. O. J., Pamikiran, R. D. C. H., Kaparang, F. E., Dien, H. V., Masengi, A. W. R., Mandagi, I. F., Masengi, K. W. A. (2022). Study on use of the wooden materials to make fishing boats in shipyards at Pangi-Sauk Village, Bolaang Mongondow Regency. *Jurnal Ilmu dan Teknologi Perikanan Tangkap, 7*(2), 93-98.

Primyastanto, M., & Wati, L. A. (2018). Modern fisheries and marine production economics. Malang, Indonesia: Brawijaya University.

Purwasih, J. D., Wibowo, B. A., & Triarso, I. (2016). Analysis of comparative income purse seine and troll line fishermen in Coastal Fishing Harbor Tamperan Pacitan, East Java. *Journal of Fisheries Resource Utilization Management and Technology, 5*(1), 37-46.

Rahmat, E., & Patadjangi, A. (2008). Trolling line fishing in Palabuhanratu waters [in-Bahasa]. *Buletin Teknik Litkayasa Sumber Daya dan Penangkapan, 6*(2), 77-82.

Rahmat, E. A., & Ilhamdi, H. (2015). Operation of troll line fishing equipment in the Banda Sea based in Kendari. *Buletin Teknik Litkayasa Sumber Daya dan Penangkapan*, *13*(1), 57-61.

Sidiyasa, K., & Juliaty, N. (2003). Ironwood trees with their various aspects [in-Bahasa]. Special edition. Samarinda, Indonesia: Kalimantan Forestry Research and Development Center.

Suherman, A., Kurohman, F., & Jayanto, B. B. (2020). Operational performance of Palabuhanratu Nusantara Fishing Port (NFP) Sukabumi, West Java. *Jurnal Perikanan dan Kelautan,10*(1), 87-101.

Sukabumi Regional Maritime and Fisheries Service [MFS]. (2019). Palabuhanratu Archipelago Fishing Port annual report 2019. Sukabumi, Indonesia: Center for Statistical Data and Information, Secretariat General of the Ministry of Maritime Affairs and Fisheries.

Sukabumi Regional Maritime and Fisheries Service [MFS]. (2022). Palabuhanratu Archipelago Fishing Port annual report 2022. Sukabumi, Indonesia: Center for Statistical Data and Information, Secretariat General of the Ministry of Maritime Affairs and Fisheries.

Tambunan, Y., Sukiyono, K., & Romdhon, M. (2018). Analysis of financial and non-financial performance of marine capture fisheries using gillnet in Baai Island Port of Bengkulu Province. *Indonesian Journal of Agricultural Research*, *1*(1), 30-41.

Taniu, S., Sari, D. W., Satria, D., Haryanto, T., & Amirusholihin, A. (2023). Analysis of household income of capture fisheries business in Indonesia. *Agroekonomika, 12*(1), 1-10.

Vinay, A., Ramasubramanian, V., Azeez, P. A., Kumar, R., & Kumar, D. K. (2017). Economic analysis of troll line fisheries in Androth, Lakshadweep, India. *International Journal of Current Microbiology and Applied Sciences, 6*(11), 3172-3179.

Yuliyanah, Nurani, T. W., & Wahyuningrum, P. I. (2020). Strategy for increasing quality of fish tuna fishing tonda fisherman catching capacity in Palabuhanratu Archipelago Port. Prosiding Seminar Nasional Perikanan Tangkap ke-8. Bogor Indonesia: IPB University.